

=====

Sequence Listing was accepted.

If you need help call the Patent Electronic Business Center at (866)
217-9197 (toll free).

Reviewer: markspencer

Timestamp: [year=2008; month=11; day=21; hr=15; min=42; sec=16; ms=454;
]

=====

Application No:	10583179	Version No:	2.0
-----------------	----------	-------------	-----

Input Set:

Output Set:

Started:	2008-10-29 12:54:38.324
Finished:	2008-10-29 12:54:38.688
Elapsed:	0 hr(s) 0 min(s) 0 sec(s) 364 ms
Total Warnings:	0
Total Errors:	0
No. of SeqIDs Defined:	8
Actual SeqID Count:	8

SEQUENCE LISTING

<110> Agency for Science, Technology and Research

<120> Protein Separation Device

<130> 51571-4

<140> 10583179

<141> 2008-10-29

<150> US 60/530,608

<151> 2003-12-19

<160> 8

<170> PatentIn version 3.3

<210> 1

<211> 1647

<212> DNA

<213> Escherichia coli

<220>

<221> misc_feature

<223> GroEL wildtype DNA sequence

<400> 1

atggcagcta	aagacgtaaa	attcggtaac	gacgctcgtg	tgaaaatgct	gcgcggcgta	60
aacgtactgg	cagatgcagt	gaaagttacc	ctcgggtccga	aaggccgtaa	cgtagttctg	120
gataaatctt	tccgtgcacc	gaccatcacc	aaagatgggtg	tttccgttgc	tcgtgaaatc	180
gaactggaag	acaagttcga	aaacatgggt	gcgcagatgg	tgaaagaagt	tgcttctaaa	240
gcgaacgacg	ctgcaggcga	cgggtaccacc	actgcaaccg	tactggctca	ggctatcatc	300
actgaaggtc	tgaaagctgt	tgctgcgggc	atgaacccga	tggaacctgaa	acgtggtatc	360
gacaaagctg	ttaccgctgc	agttgaagaa	ctgaaagcgc	tgtccgtacc	gtgctctgac	420
tctaaagcga	ttgctcaggt	tggtactatc	tccgctaact	ccgacgaaac	cgtaggtaaa	480
ctgatcgcgtg	aagcgatgga	caaagtcggt	aaagaaggcg	ttatcacctg	tgaagacggt	540
accggtctgc	aggacgaact	ggacgtgggt	gaaggatatgc	agttcgaccg	tggtacctg	600
tctccttact	tcatcaacaa	gccggaaact	ggcgcagtag	aactggaaag	cccgttcac	660
ctgctggctg	acaagaaaat	ctccaacatc	cgcgaaatgc	tgccggttct	ggaagccgtt	720
gccaaagcag	gcaaaccgct	gctgatcatc	gctgaagatg	tagaaggcga	agcgtggca	780
actctggttg	ttaacaccat	gcgtggcatc	gtgaaagttg	ctgcagttaa	agctccgggc	840
ttcggcgatc	gtcgtaaagc	tatgctgcag	gatatcgcaa	ccctgactgg	cggtagcgta	900
atctctgaag	agatcgggat	ggagctggaa	aaagcaaccc	tggaagacct	gggtcaggct	960
aaacgcgttg	tgatcaacaa	agacaccacc	accatcatcg	atggcgtggg	cgaagaagct	1020
gcaatccagg	gccgtggtgc	tcagatccgt	cagcagattg	aagaagcaac	ttctgactac	1080
gaccgtgaaa	aactgcagga	gcgcgtagcg	aaactggcag	gcggcggtgc	agttatcaaa	1140
gtaggtgctg	ctaccgaagt	tgaaatgaaa	gagaaaaaag	cacgcgttga	agacgccctg	1200
cacgcgaccc	gtgctgcggg	agaagaaggc	gtgggttgctg	gtgggtgggtg	tgcgctgatc	1260
cgcgtagcgt	ctaaactggc	tgacctgcgt	ggtcagaacg	aagaccagaa	cgtgggtatc	1320
aaagttgcac	tgctgtcaat	ggaagctccg	ctgcgtcaga	tcgtcctgaa	ctgcggcgaa	1380
gaaccgtctg	ttgttgctaa	caccgttaaa	ggcggcgacg	gcaactacgg	ttacaacgca	1440
gcaaccgaag	aatacggcaa	catgatcgac	atgggtatcc	tggaaccaac	caaagtaacc	1500
cgttctgctc	tgcagtacgc	ggcttctgtg	gctggcctga	tgatcaccac	cgaatgcatg	1560
gttaccgacc	tgccgaaaaa	cgatgcagct	gacttaggcg	ctgctggcgg	catgggtggc	1620

<210> 2

<211> 548

<212> PRT

<213> Escherichia coli

<220>

<221> misc_feature

<223> GroEL wildtype amino acid sequence

<400> 2

Met Ala Ala Lys Asp Val Lys Phe Gly Asn Asp Ala Arg Val Lys Met

1 5 10 15

Leu Arg Gly Val Asn Val Leu Ala Asp Ala Val Lys Val Thr Leu Gly

20 25 30

Pro Lys Gly Arg Asn Val Val Leu Asp Lys Ser Phe Gly Ala Pro Thr

35 40 45

Ile Thr Lys Asp Gly Val Ser Val Ala Arg Glu Ile Glu Leu Glu Asp

50 55 60

Lys Phe Glu Asn Met Gly Ala Gln Met Val Lys Glu Val Ala Ser Lys

65 70 75 80

Ala Asn Asp Ala Ala Gly Asp Gly Thr Thr Thr Ala Thr Val Leu Ala

85 90 95

Gln Ala Ile Ile Thr Glu Gly Leu Lys Ala Val Ala Ala Gly Met Asn

100 105 110

Pro Met Asp Leu Lys Arg Gly Ile Asp Lys Ala Val Thr Ala Ala Val

115 120 125

Glu Glu Leu Lys Ala Leu Ser Val Pro Cys Ser Asp Ser Lys Ala Ile

130 135 140

Ala Gln Val Gly Thr Ile Ser Ala Asn Ser Asp Glu Thr Val Gly Lys

145 150 155 160

Leu Ile Ala Glu Ala Met Asp Lys Val Gly Lys Glu Gly Val Ile Thr

165 170 175

Val Glu Asp Gly Thr Gly Leu Gln Asp Glu Leu Asp Val Val Glu Gly

180 185 190

Met Gln Phe Asp Arg Gly Tyr Leu Ser Pro Tyr Phe Ile Asn Lys Pro

195 200 205

Glu Thr Gly Ala Val Glu Leu Glu Ser Pro Phe Ile Leu Leu Ala Asp

210 215 220

Lys Lys Ile Ser Asn Ile Arg Glu Met Leu Pro Val Leu Glu Ala Val

225		230		235		240
Ala Lys Ala Gly Lys Pro Leu Leu Ile Ile Ala Glu Asp Val Glu Gly						
	245		250		255	
Glu Ala Leu Ala Thr Leu Val Val Asn Thr Met Arg Gly Ile Val Lys						
	260		265		270	
Val Ala Ala Val Lys Ala Pro Gly Phe Gly Asp Arg Arg Lys Ala Met						
	275		280		285	
Leu Gln Asp Ile Ala Thr Leu Thr Gly Gly Thr Val Ile Ser Glu Glu						
	290		295		300	
Ile Gly Met Glu Leu Glu Lys Ala Thr Leu Glu Asp Leu Gly Gln Ala						
305		310		315		320
Lys Arg Val Val Ile Asn Lys Asp Thr Thr Thr Ile Ile Asp Gly Val						
	325		330		335	
Gly Glu Glu Ala Ala Ile Gln Gly Arg Val Ala Gln Ile Arg Gln Gln						
	340		345		350	
Ile Glu Glu Ala Thr Ser Asp Tyr Asp Arg Glu Lys Leu Gln Glu Arg						
	355		360		365	
Val Ala Lys Leu Ala Gly Gly Val Ala Val Ile Lys Val Gly Ala Ala						
	370		375		380	
Thr Glu Val Glu Met Lys Glu Lys Lys Ala Arg Val Glu Asp Ala Leu						
385		390		395		400
His Ala Thr Arg Ala Ala Val Glu Glu Gly Val Val Ala Gly Gly Gly						
	405		410		415	
Val Ala Leu Ile Arg Val Ala Ser Lys Leu Ala Asp Leu Arg Gly Gln						
	420		425		430	
Asn Glu Asp Gln Asn Val Gly Ile Lys Val Ala Leu Arg Ala Met Glu						
	435		440		445	
Ala Pro Leu Arg Gln Ile Val Leu Asn Cys Gly Glu Glu Pro Ser Val						
	450		455		460	
Val Ala Asn Thr Val Lys Gly Gly Asp Gly Asn Tyr Gly Tyr Asn Ala						
465		470		475		480
Ala Thr Glu Glu Tyr Gly Asn Met Ile Asp Met Gly Ile Leu Asp Pro						
	485		490		495	
Thr Lys Val Thr Arg Ser Ala Leu Gln Tyr Ala Ala Ser Val Ala Gly						
	500		505		510	
Leu Met Ile Thr Thr Glu Cys Met Val Thr Asp Leu Pro Lys Asn Asp						
	515		520		525	

Ala Ala Asp Leu Gly Ala Ala Gly Gly Met Gly Gly Met Gly Gly Met
530 535 540

Gly Gly Met Met
545

<210> 3
<211> 1647
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<223> GroEL-Asp490Cys DNA sequence

<220>
<221> mutation
<222> (1468)..(1470)
<223> GAC to TGC

<400> 3
atggcagcta aagacgtaaa attcggtaac gacgctcgtg tgaaaatgct gcgcggcgta 60
aacgtactgg cagatgcagt gaaagttacc ctcggtccga aaggccgtaa cgtagtctctg 120
gataaatctt tcggtgcacc gaccatcacc aaagatgggtg tttccgttgc tcgtgaaatc 180
gaactggaag acaagttcga aaacatgggt gcgcagatgg tgaaagaagt tgcctctaaa 240
gcgaacgacg ctgcaggcga cgggtaccacc actgcaaccg tactggetca ggctatcatc 300
actgaaggtc tgaaagctgt tgctgcgggc atgaaccgga tggacctgaa acgtgggtatc 360
gacaaagctg ttaccgctgc agttgaagaa ctgaaagcgc tgtccgtacc gtgctctgac 420
tctaaagcga ttgctcaggt tgggtactatc tccgctaact ccgacgaaac cgtaggtaaa 480
ctgatcgtctg aagcgatgga caaagtcggt aaagaaggcg ttatcaccgt tgaagacggt 540
accggtctgc aggacgaact ggacgtgggt gaaggtatgc agttcgaccg tggctacctg 600
tctccttact tcatcaacaa gccggaaact ggcgcagtag aactggaaag cccgttcac 660
ctgctggctg acaagaaaat ctccaacatc cgcgaaatgc tgccggttct ggaagccgtt 720
gccaaagcag gcaaaccgct gctgatcatc gctgaagatg tagaaggcga agcgctggca 780
actctggttg ttaacaccat gcgtggcatc gtgaaagttg ctgcagttaa agctccgggc 840
ttcggcgatc gtcgtaaagc tatgctgcag gatatcgcaa ccctgactgg cggtaccgta 900
atctctgaag agatcggtat ggagctggaa aaagcaacce tggaaagacct gggtcaggct 960
aaacgcgttg tgatcaacaa agacaccacc accatcatcg atggcggtggg cgaagaagct 1020
gcaatccagg gccgtgttgc tcagatccgt cagcagattg aagaagcaac ttctgactac 1080
gaccgtgaaa aactgcagga gcgcgtagcg aaactggcag gcggcgttgc agttatcaaa 1140
gtaggtgctg ctaccgaagt tgaaatgaaa gagaaaaaag cacgcgttga agacgccctg 1200
cacgcgaccc gtgctgcggt agaagaaggc gtgggttgctg gtgggtgggtg tgcgctgatc 1260
cgcgtagcgt ctaaactggc tgacctgcgt ggtcagaacg aagaccagaa cgtgggtatc 1320
aaagttgcac tgcgtgcaat ggaagctccg ctgcgtcaga tcgtcctgaa ctgcggcgaa 1380
gaaccgtctg ttgttgctaa caccgttaaa ggcggcgacg gcaactacgg ttacaacgca 1440
gcaaccgaag aatacggcaa catgatctgc atgggtatcc tggaccaaac caaagtaacc 1500
cgttctgctc tgcagtacgc ggcttctgtg gctggcctga tgatcaccac cgaatgcatg 1560
gttaccgacc tgccgaaaaa cgatgcagct gacttaggcg ctgctggcgg catgggtggc 1620
atgggtggca tgggcggcat gatgtaa 1647

<210> 4
<211> 548
<212> PRT
<213> Escherichia coli

```

<220>
<221>  misc_feature
<223>  GroEL Asp490Cys amino acid sequence

<220>
<221>  SITE
<222>  (490)..(490)
<223>  D to C

<400>  4
Met Ala Ala Lys Asp Val Lys Phe Gly Asn Asp Ala Arg Val Lys Met
1          5          10          15

Leu Arg Gly Val Asn Val Leu Ala Asp Ala Val Lys Val Thr Leu Gly
          20          25          30
Pro Lys Gly Arg Asn Val Val Leu Asp Lys Ser Phe Gly Ala Pro Thr
          35          40          45

Ile Thr Lys Asp Gly Val Ser Val Ala Arg Glu Ile Glu Leu Glu Asp
          50          55          60

Lys Phe Glu Asn Met Gly Ala Gln Met Val Lys Glu Val Ala Ser Lys
65          70          75          80

Ala Asn Asp Ala Ala Gly Asp Gly Thr Thr Thr Ala Thr Val Leu Ala
          85          90          95

Gln Ala Ile Ile Thr Glu Gly Leu Lys Ala Val Ala Ala Gly Met Asn
          100          105          110

Pro Met Asp Leu Lys Arg Gly Ile Asp Lys Ala Val Thr Ala Ala Val
          115          120          125

Glu Glu Leu Lys Ala Leu Ser Val Pro Cys Ser Asp Ser Lys Ala Ile
          130          135          140

Ala Gln Val Gly Thr Ile Ser Ala Asn Ser Asp Glu Thr Val Gly Lys
145          150          155          160

Leu Ile Ala Glu Ala Met Asp Lys Val Gly Lys Glu Gly Val Ile Thr
          165          170          175

Val Glu Asp Gly Thr Gly Leu Gln Asp Glu Leu Asp Val Val Glu Gly
          180          185          190

Met Gln Phe Asp Arg Gly Tyr Leu Ser Pro Tyr Phe Ile Asn Lys Pro
          195          200          205

Glu Thr Gly Ala Val Glu Leu Glu Ser Pro Phe Ile Leu Leu Ala Asp
          210          215          220

Lys Lys Ile Ser Asn Ile Arg Glu Met Leu Pro Val Leu Glu Ala Val
225          230          235          240

Ala Lys Ala Gly Lys Pro Leu Leu Ile Ile Ala Glu Asp Val Glu Gly
          245          250          255

```

Glu	Ala	Leu	Ala	Thr	Leu	Val	Val	Asn	Thr	Met	Arg	Gly	Ile	Val	Lys		
			260			265						270					
Val	Ala	Ala	Val	Lys	Ala	Pro	Gly	Phe	Gly	Asp	Arg	Arg	Lys	Ala	Met		
			275			280						285					
Leu	Gln	Asp	Ile	Ala	Thr	Leu	Thr	Gly	Gly	Thr	Val	Ile	Ser	Glu	Glu		
			290			295						300					
Ile	Gly	Met	Glu	Leu	Glu	Lys	Ala	Thr	Leu	Glu	Asp	Leu	Gly	Gln	Ala		
305						310						315			320		
Lys	Arg	Val	Val	Ile	Asn	Lys	Asp	Thr	Thr	Thr	Ile	Ile	Asp	Gly	Val		
				325						330						335	
Gly	Glu	Glu	Ala	Ala	Ile	Gln	Gly	Arg	Val	Ala	Gln	Ile	Arg	Gln	Gln		
			340			345						350					
Ile	Glu	Glu	Ala	Thr	Ser	Asp	Tyr	Asp	Arg	Glu	Lys	Leu	Gln	Glu	Arg		
			355			360						365					
Val	Ala	Lys	Leu	Ala	Gly	Gly	Val	Ala	Val	Ile	Lys	Val	Gly	Ala	Ala		
			370			375						380					
Thr	Glu	Val	Glu	Met	Lys	Glu	Lys	Lys	Ala	Arg	Val	Glu	Asp	Ala	Leu		
385						390						395			400		
His	Ala	Thr	Arg	Ala	Ala	Val	Glu	Glu	Gly	Val	Val	Ala	Gly	Gly	Gly		
				405						410						415	
Val	Ala	Leu	Ile	Arg	Val	Ala	Ser	Lys	Leu	Ala	Asp	Leu	Arg	Gly	Gln		
			420			425						430					
Asn	Glu	Asp	Gln	Asn	Val	Gly	Ile	Lys	Val	Ala	Leu	Arg	Ala	Met	Glu		
			435			440						445					
Ala	Pro	Leu	Arg	Gln	Ile	Val	Leu	Asn	Cys	Gly	Glu	Glu	Pro	Ser	Val		
			450			455						460					
Val	Ala	Asn	Thr	Val	Lys	Gly	Gly	Asp	Gly	Asn	Tyr	Gly	Tyr	Asn	Ala		
465						470						475			480		
Ala	Thr	Glu	Glu	Tyr	Gly	Asn	Met	Ile	Cys	Met	Gly	Ile	Leu	Asp	Pro		
				485						490						495	
Thr	Lys	Val	Thr	Arg	Ser	Ala	Leu	Gln	Tyr	Ala	Ala	Ser	Val	Ala	Gly		
			500			505						510					
Leu	Met	Ile	Thr	Thr	Glu	Cys	Met	Val	Thr	Asp	Leu	Pro	Lys	Asn	Asp		
			515			520						525					
Ala	Ala	Asp	Leu	Gly	Ala	Ala	Gly	Gly	Met	Gly	Gly	Met	Gly	Gly	Met		
			530			535						540					
Gly	Gly	Met	Met														
545																	

<210> 5
<211> 1647
<212> DNA
<213> Escherichia coli

<220>
<221> misc_feature
<223> GroEL apical domain RYD modification DNA sequence

<220>
<221> mutation
<222> (598)..(606)
<223> CTGTCTCCT to CGTTATGAT

<220>
<221> mutation
<222> (1468)..(1470)
<223> GAC to TGC

<400> 5
atggcagcta aagacgtaaa attcggtaac gacgctcgtg tgaaaatgct gcgcggcgta 60
aacgtactgg cagatgcagt gaaagttacc ctcggtccaa aaggccgtaa cgtagtctctg 120
gataaatctt tcggtgcacc gaccatcacc aaagatgggtg tttccgttgc tcgtgaaatc 180
gaactggaag acaagttcga aaatatgggt gcgcagatgg tgaaagaagt tgctctctaaa 240
gcaaacgacg ctgcaggcga cgggtaccacc actgcaaccg tactggetca ggctatcatc 300
actgaaggtc tgaaagctgt tgctgcgggc atgaaccgga tggacctgaa acgtgggtatc 360
gacaaagcgg ttaccgttgc agttgaagaa ctgaaagcgc tgtccgtacc atgctctgac 420
tctaaagcga ttgctcaggt tgggtaccatc tccgctaact ccgacgaaac cgtaggtaaa 480
ctgatcgtg aagcgatgga caaagtcggt aaagaaggcg ttatcaccgt tgaagacggt 540
accggtctgc aggacgaact ggacgtggtt gaaggatatgc agttcgaccg tggctaccgt 600
tatgattact tcatcaacaa gccggaaact ggcgcagtag aactggaaag cccgttcatc 660
ctgctggctg acaagaaaat ctccaacatc cgcgaaatgc tgccggttct ggaagctggt 720
gccaaagcag gcaaaccgct gctgatcatc gctgaagatg tagaaggcga agcgtggca 780
actctggttg ttaacaccat gcgtggcatc gtgaaagtcg ctgcggttaa agcaccgggc 840
ttcggcgatc gtcgtaaagc tatgctgcag gatatcgcaa ccctgactgg cggtagcgtg 900
atctctgaag agatcgggat ggagctggaa aaagcaacce tgggaagacct gggtcaggct 960
aaacgtgttg tgatcaacaa agacaccacc actatcatcg atggcgtggg tgaagaagct 1020
gcaatccagg gccgtgttgc tcagatccgt cagcagattg aagaagcaac ttctgactac 1080
gaccgtgaaa aactgcagga acgcgtagcg aaactggcag gcggcggttgc agttatcaaa 1140
gtgggtgctg ctaccgaagt tgaaatgaaa gagaaaaaag cacgcgttga agatgccctg 1200
cacgcgaccc gtgctgcggt agaagaaggc gtgggttgctg gtgggtggtgt tgcgctgatc 1260
cgcgtagcgt ctaaactggc tgacctgcgt ggtcagaacg aagaccagaa cgtgggtatc 1320
aaagttgcac tgcgtgcaat ggaagctccg ctgcgtcaga tcgtattgaa ctgcggcgaa 1380
gaaccgtctg ttgttgctaa caccgttaaa ggcggcgacg gcaactacgg ttacaacgca 1440
gcaaccgaag aatacggcaa catgatctgc atgggtatcc tggatccaac caaagtaact 1500
cgttctgctc tgcagtacgc agcttctgtg gctggcctga tgatcaccac cgaatgcatg 1560
gttaccgacc tgccgaaaaa cgatgcagct gacttaggcg ctgctggcgg tatgggcggc 1620
atgggtggca tgggcggcat gatgtaa 1647

<210> 6
<211> 548
<212> PRT
<213> Escherichia coli

<220>
<221> misc_feature
<223> GroEL apical domain RYD modification

<220>
<221> SITE
<222> (200)..(202)
<223> LSP to RYD

<220>
<221> site
<222> (490)..(490)
<223> D to C

<400> 6
Met Ala Ala Lys Asp Val Lys Phe Gly Asn Asp Ala Arg Val Lys Met
1 5 10 15

Leu Arg Gly Val Asn Val Leu Ala Asp Ala Val Lys Val Thr Leu Gly
20 25 30

Pro Lys Gly Arg Asn Val Val Leu Asp Lys Ser Phe Gly Ala Pro Thr
35 40 45

Ile Thr Lys Asp Gly Val Ser Val Ala Arg Glu Ile Glu Leu Glu Asp
50 55 60

Lys Phe Glu Asn Met Gly Ala Gln Met Val Lys Glu Val Ala Ser Lys
65 70 75 80

Ala Asn Asp Ala Ala Gly Asp Gly Thr Thr Thr Ala T